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FEDERAL COMMUNICATIONS COMMISSION
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Marlene H. Dortch, Secretary
Federal Communications Commission
The Portals Building
445 12th Street, SW TW-A325
Washington, DC 20554

Rc: RM-10403
In the Matter of Progeny LMS, LLC Petition for Rulemaking to Amend Part 90 of the
Commission's Rules Governing the Location and Monitoring Service

Ex Parte Comments of Intermec Technologies Corporation

Dear Ms. Dortch:

Intermec Technologies Corporation ("Intermec")¹ hereby submits the following *ex parte* comments in response to the white paper submitted by Progeny LMS, LLC ("Progeny") in the above-referenced proceeding.² Upon thorough review of Progeny's white paper and proposed amendments, Intermec remains convinced that Progeny's proposal would change the very nature of LMS operations at the expense of unlicensed devices operating in the same band.

The proposed amendments would render much of the band effectively unusable by unlicensed devices, thereby upsetting the current balance between Part 15 and LMS in the 902-928 MHz band. This balance, between licensed and unlicensed users, embodies the flexible use model which is both praised by the Commission in recent policy statements and encouraged in the

¹ Intermec is a manufacturer of devices which employ both Wireless LAN ("WLAN") and Radio Frequency Identification ("RFID") technology operating under Part 15 of the Commission's rules in the 900 MHz frequency. It also produces a variety of devices that operate pursuant to Part 15 in the 2.4 and 5 GHz bands.

² *Ex Parte* Comments, Progeny LMS, LLC, RM 10403 (Oct. 12, 2002) (also submitting its "white paper").

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Spectrum Policy Task Force Report as a model for future spectrum allocation. Furthermore, because of flawed analysis, Progeny's white paper can not serve as a credible basis for altering the 902-928 MHz band.

Background

In a previous filing, Intermec highlighted the characteristics of the 900 MHz band which make it uniquely attractive for the operation of WLAN and RFID devices.³ Because of the band's longer wavelength and narrow channel bandwidth, devices operating in the 900 MHz band can provide nearly three times the range available for similar radio applications in the 2.4 and 5 GHz bands. Consequently, WLAN devices are able to accommodate large campus scenarios and RFID long range (3 to 6 meter) passive responders are able to meet a number of application requirements in supply chain management including access control, shipping container security, airline baggage matching and a wide variety of other applications.

Numerous other parties have filed similar comments, seeking denial of proposals set forth by both Progeny and Warren Havens in this proceeding. These comments have both noted the band's important aspects for unlicensed devices as well as the significant investment in Part 15 devices currently operating in this band.⁴ Intermec and other Part 15 manufacturers have invested millions of dollars in the development, production and installation of WLAN and RFID products operating in this frequency. Furthermore, world-wide industry standards have developed based in-part upon the protected use of this frequency for unlicensed devices.⁵

Since Intermec filed its comments, Progeny submitted a white paper which purports to demonstrate that, under its proposed changes, unlicensed devices operating in the 900 MHz band would receive no greater interference than that already associated with the use of other Part 15 devices in the band. Progeny's white paper is not an accurate depiction of interference attributable to either Part 15 devices or LMS in the 902-928 MHz band.

³ *Ex Parte Comments*, Intermec Technologies Corp., RM 10403 (Aug. 12, 2002).

⁴ *See. e.g., Ex Parte Comments*, Inovonics Wireless Corp., RM 10403 (Oct. 3, 2002); *Ex Parte Comments IEEE 802 Radio Regulatory Technical Advisory Group*, RM 10403 (Sept. 29, 2002); *Ex Parte Comments*, Ricochet Networks, Inc., RM 10403 (Aug. 20, 2002); *Ex Parte Comments*, United Telecom Council, RM 10403 (July, 1, 2002); and *Comments*, ITRON, Inc., RM 10403 (May 15, 2002).

⁵ *Ex Parte Comments IEEE 802 Radio Regulatory Technical Advisory Group*, RM 10403 (Sept. 29, 2002); *Ex Parte Comments*, Intermec Technologies Corp., RM 10403 (Aug. 12, 2002).

White Paper Analysis

Intermec's engineers have thoroughly reviewed Progeny's white paper and find that Progeny makes numerous errors and questionable assumptions in its comparative analysis of LMS and Part 15 interference which lead ultimately to inaccurate interference conclusions. Not surprisingly the scenarios and inaccuracies are skewed in favor of lower LMS interference. Most notable is Progeny's use of directional antenna in favor of LMS. The white paper repeatedly compares LMS interference to interference received from Part 15 devices operating at the maximum output level as permitted under Part 15.247.⁶ However, the analysis does not include interference mitigation factors as required by Part 15.247, such as the use of directional antennas at higher power levels and use of spread spectrum technologies at any power level. Progeny's LMS interference, however, is analyzed with the benefit of highly directional antenna which significantly mitigates the calculated LMS interference. The deterministic use of antenna directivity in the Progeny white paper is questionable in complex RF environments. Nonetheless, should an analysis choose to include the use of antenna directivity it should be equally applied.

Other elements of the analysis and the scenarios in the white paper underestimate the interference from LMS operations. The white paper analyzes interference according to the following services: WLANs, wireless data communication services (Ricochet), automatic meter reading (AMR) devices, and cordless telephones. In each of the service scenarios, the results are skewed by inappropriate assumptions. The following analysis of each scenario further reveals the white paper inadequacies.

WLAN

In this scenario, three WLAN units (labeled "AP," "WS1," and "WS2") were located on the same floor of an office building, with an interfering Part 15 device (labeled "INT") located directly below AP WLAN. Not surprisingly, the highest interference level for the INT device was into the AP WLAN. The analysis did not consider antenna directivity for the AP WLAN or INT device, which would typically be used for these devices. Meanwhile, the LMS interference was reduced up to 34dB through antenna directivity. Despite the preferential use of antenna directivity for LMS, the analysis demonstrates LMS interference levels (-30dBm) that are comparable to INT interference levels (-31dBm) for WS1 and WS2. These comparable interference levels were not included in the white paper summary at section 3.3. The table in section 3.3 only included the LMS interference levels that gave a favorable comparison,

Ricochet

In this scenario, a pole-top mounted Ricochet device received interference from an LMS base station and a Part 15 device located above ground level (ACL) at 150 feet and 35 feet, respectively. Although the LMS and Part 15 device were located equal distances away from the Ricochet receiver, a line-of-sight (LOS) propagation model was applied to

⁶ 47 C.F.R. § 15.247

the Part 15 device while a noli-line-of-sight (NLOS) propagation model was applied to LMS. The use of different propagation models mitigated the interference from LMS by approximately 30dB compared to that of the Part 15 device. If different propagation models are to be used, the NLOS model should be applied to the Part 15 device. Located at only 35 feet AGL, the Part 15 device is much more likely to be obstructed than an LMS base station at 150 feet AGL. This more appropriate application of propagation models would cause the interference of LMS to be well above interference from Part 15 for Ricochet receivers.

In this scenario, Progeny also included heavy mitigation (11dB) of LMS interference by use of directional antennas. In urban environments at the cited 500 feet distance, this mitigation is highly questionable. Additionally, the NLOS propagation model (COST-WI) employed in the analysis is applicable to mobile units (Ricochet receivers in the analysis) at a height of from 1 to 3 meters. However, the 4.6 meter receiver height for the Ricochet devices is beyond the bounds of the model.

AMR

In this scenario, an AMR unit was located one half mile from an LMS base station and only one-tenth mile from a Part 15 device. Although previous scenarios compared interference at relative distances, this scenario poses the Part 15 device five times closer than the LMS base station. Despite the difference in distances, the Part 15 device and LMS produced comparable interference levels. Had the distances actually been comparable, the LMS interference would have exceeded that of the Part 15 device.

Additionally, mounting the Part 15 device outdoors at 50 feet is highly unusual. Either indoor or outdoor mounting at a lower height is a more likely scenario, and would have caused the LMS to further exceed the Part 15 interference.

Cordless Telephone

In this scenario, a cordless telephone received interference from LMS and a Part 15 device located above ground level at 150 feet and 50 feet, respectively. As in the AMR scenario, the LMS base station was five times further from the cordless phone than the Part 15 device. Despite these differences, the results indicated that interference from LMS and Part 15 devices is comparable. Again, however, had the scenario accounted for distances or for a more likely mounting of the Part 15 device (lower than 50 feet high), the interference from LMS would have exceeded that of the Part 15 device.

Of greater concern is the scenario's lack of frequency and power analysis of the cordless telephone. Many cordless telephones operate under Part 15.249 provisions for fixed frequency operation at roughly 1mW of output power, and they are inherently more susceptible to interference than Part 15.247 spread spectrum devices. Furthermore, cordless telephones may represent a majority of 915 MHz ISM devices in operation, and the distance from cordless phones to interference sources would likely be well under Progeny's half-mile assumption for the LMS base station.

Spectrum Policy Development

In the last several months, the Commission has announced a broad inquiry into its current spectrum policy whereby it seeks to modernize what the Commission has termed “outmoded” spectrum rules.⁷ At the initiation of this inquiry, the Spectrum Policy Task Force praised the current rules under which unlicensed devices currently coexist with licensees in the same spectrum. The Report recommends that the Commission should strive to apply this type of flexible-use principle for allocating spectrum in other bands as well. Furthermore, the Report suggests that, “because many of the benefits of flexibility have already been realized in these bands, and spectrum uses have developed accordingly, there is not a significant need for fundamental regulatory changes in these bands in the near term.”⁸

In the recent *Notice of Inquiry* regarding the expansion of spectrum for unlicensed devices, the Commission also noted the success of these bands, indicating that it will attempt to imitate that success in other bands.⁹ The Commission identified three primary reasons for the success in these bands: (1) the devices are allowed to operate at higher powers in these bands; (2) sufficient spectrum in each band permits multiple users; and (3) there are no application restrictions on unlicensed devices in these bands. As the Commission correctly identified, these characteristics of the 902-928 MHz band help make it valuable to part 15 manufacturers. In fact, the current LMS rules embody the type of forward-thinking principles the Commission seeks to employ for other bands.

⁷ *Spectrum Policy Task Force Presents Recommendations For Spectrum Policy Reform*, Press Release (Nov. 7, 2002) (quoting Chairman Powell).

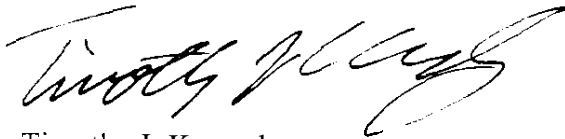
⁸ FCC, *Spectrum Policy Task Force Report*, ET Dkt No. 02-135, at p. 46 (Nov. 2002) (noting also that the Commission should focus first on initiating transition in those bands where additional flexibility will provide the greatest benefits at the least cost. . . the greatest benefits will be realized in those bands in which the current regulatory regime has led to significant underutilization or inefficient use of the spectrum”).

⁹ See “Commission Seeks Public Comment on Spectrum Policy Task Force,” ET Dkt. No. 02-135, FCC Public Notice (rel. Nov. 25, 2002); and *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Dkt No. 02-380, Notice of Inquiry, FCC 02-328 at ¶ 7 (rel. Dec. 20, 2002) (“*Notice of Inquiry*”) (“[t]he success of our unlicensed device rules for the ISM bands shows that there could be significant benefits to the economy, businesses and the general public in making additional spectrum available for unlicensed transmitters.”)

Conclusion

The Commission has broad discretion in determining whether it should initiate a rulemaking and is under no obligation to do so.¹⁰ Progeny's proposed changes would provide a large windfall for LMS operators and essentially force Part 15 devices out of the band. This would result in substantial economic harm to the thousands of Part 15 device users. The Progeny white paper does not provide any reliable evidence that such an exodus would not result. It is therefore inappropriate for the Commission to initiate this rulemaking.

Respectfully Submitted,

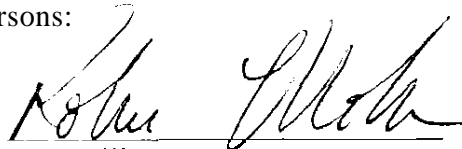
A handwritten signature in black ink, appearing to read "Timothy J. Kennedy". The signature is fluid and cursive, with a long horizontal stroke at the end.

Timothy J. Kennedy
Division Counsel

¹⁰ *Action for Children's Television v. FCC*, 564 F.2d 458, 479 (DC Cir. 1977) (noting that "the Commission has considerable latitude in responding to requests to institute proceedings or promulgate rules").

CERTIFICATE OF SERVICE

I, Robert Millar, certify that on this 20th day of March 2003, a true and correct copy of the foregoing written *ex parte* statements of Intermec Technologies Corporation were served via courier or First Class Mail on the following persons:



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